DEPARTMENT OF THE ARMY

Washington, D.C.

Honorable J. Lee Rankin
Solicitor General of the United States
Department of Justice
Washington, D.C.

Dear Mr. Rankin:

In your letter of 14 January to Major General Emerson C. Itschner, Chief of Engineers, you request his views as to the facts stated in the documents filed with the Supreme Court concerning Lake Michigan diversions at Chicago. The amended application now pending in the Supreme Court would require the State of Illinois and the Metropolitan Sanitary District of Greater Chicago to return the effluent from "domestic pumpage" to Lake Michigan.

Attached is an analysis prepared by Major General Itschner of the amended application.

Sincerely yours,

/s/ WILBER M. BRUCKER
Secretary of the Army

1 Incl.
Analysis (in dup)

12 February 1959

Analysis of Amended Application by the States of Wisconsin, Minnesota, Ohio, Pennsylvania, Michigan and New York to the U. S. Supreme Court for Reopening and Amendment of the Decree of April 21, 1930 re Lake Michigan Diversions at Chicago.

The following analysis of the Amended Application to the U. S. Supreme Court has been prepared in response to request from the Solicitor General, Department of Justice, as contained in his letter of 14 January. The amended application is in further support of the original application in which it was requested that the State of Illinois and the Metropolitan Sanitary District of Greater Chicago be required to return the effluent from "domestic pumpage" to Lake Michigan. The original application was denied by Court order entered on 3 March 1958.

It is stated in the first paragraph on page 12 of the amended application:

> "It decreases the carrying capacity of the large lake vessels by from 180 to 200 tons per cargo. It takes away annually more than 2,500,000 tons of carrying capacity of the Great Lakes vessels at a loss of more than $4,000,000 in annual revenues."

The estimate of decrease in carrying capacity of large lake vessels of 180 to 200 tons per cargo for a decrease in draft of 1.8 inches is considered to be of the proper magnitude.

The estimate of annual tonnage loss of 2,500,000 tons with a value of $4,000,000 appears to be based on an assumption of full utilization of the United States and Canadian Great Lakes fleet with lake levels so low that all vessels would be affected. We do not have sufficient information on the composition of the Canadian fleet to estimate the reduction in its capacity. In paragraph 172 of Senate Document 28, 85th Congress, the Corps of Engineers estimated that the reduction in capacity for the United States Great Lakes fleet under similar assumptions for a permanent increase in diversion of 1,000 cubic feet per second

would be 1,000,000 tons. The reduction of capacity for a diversion of 1,800 cubic feet per second would be 1,800,000 tons on the same basis. However, as a practical matter, the assumed conditions on which the above estimates are based could never occur since some of the smaller, lighter draft vessels in the fleet would not be restricted in their loading because of limited channel depths even during periods of low lake stages.

The average annual loss to the United States Great Lakes fleet as determined in Senate Document 28 for a permanent increase in diversion of 1,000 cubic feet per second, was 300,000 tons (page 47). The results of that study are still considered to be valid based on data available at that time, but are subject to some adjustment due to more up-to-date information.

It is considered that the most reasonable estimate of average annual losses to the United States Great Lakes fleet, resulting from a lowering of lake levels due to an increase in diversions, should be based on the criteria used in the study in Senate Document 28. These criteria are as follows:

a. The anticipated United States Great Lakes Commerce and fleet as of 1985.

b. The present general pattern of traffic on the Great Lakes.

c. Waterway improvements to the connecting channels and harbors which can be expected to be accomplished.

d. The natural variation in levels of the Great Lakes.

The current analysis has been based on the fluctuation

of lake levels as occurred for the 35-year period 1922-1956 in accordance with the criteria listed above. With use of data comparable to that available for the Senate Document 28 studies, it is estimated that with a permanent increase in diversion of 1,800 cubic feet per second the average annual loss would be 540,000 tons. Recent studies of future traffic in iron ore and stone indicate that estimates used in Senate Document 28 should be revised upward about 10 percent. More recent estimates are not available for prospective traffic in other commodities. It is considered appropriate to increase the estimated average annual loss in Senate Document 28 by 10 percent, from 300,000 tons to 330,000 tons, and to also increase by 10 percent the estimate of annual losses for a diversion of 1,800 cubic feet per second from 540,000 tons to 594,000 tons, say in round numbers 600,000 tons.

The value of $0.80 per ton as used in Senate Document 28 has been reviewed in the light of more recent information on cost of transportation as developed in connection with the Great Lakes Harbor studies. In these studies, the actual cost per ton varied from $0.34 per ton for short haul coal trips to $1.80 per ton for grain from Duluth to Buffalo. The estimated composite or weighted average cost is considered to be $1.10 per ton. Accordingly, the average annual loss due to a permanent diversion of 1,800 cubic feet per second is estimated to have a value of $660,000.

In the second paragraph on page 12 of the amended application it is stated that the port development expenditures for the Great Lakes ports for the 12-year period 1946-1957 were approximately $147 million. The expenditures made by the Corps of Engineers during the indicated period for construction and maintenance of harbor channels and port facilities throughout the Great Lakes area total about

$87 million. Presumably the estimate in the amended application includes all expenditures by both Federal and non-Federal interests.

On page 15 of the amended application a table is given showing loss of energy, capacity, and revenue to the New York State Power Authority at its Niagara and St. Lawrence plants resulting from permanent diversion of 1,800 cubic feet per second from Lake Michigan at Chicago. The estimates are based on an equal loss of flow to Canada and the U.S. from the diversion, that is, a loss of 900 cubic feet per second at the Power Authority's plants. The estimates also appear to be obtained by the same procedure as that shown by the Power Authority as given on page 255 of the printed hearings held on 28-29 July 1958 by the Senate Public Works Committee on HR 2 and S 1123, 85th Congress.

Detailed computations to verify the energy and capacity amounts as shown are not available for analysis. Based on comparative studies, the energy values as computed appear to be the additional amount of energy that could be generated if the permanent diversion at Chicago is returned to the lake-drainage system. Substantially all of the additional energy could be generated without additional investment in power generating facilities. The monetary value of the energy presented in the amended application is considered a reasonable estimate.

Estimates of gain in capacity from the reverted waters could be determined only from a detailed analysis of many variable and complex factors. Marketing arrangements and load characteristics, now and in the future, would play an important part in determining the actual saleable capacity for various flow conditions. Accordingly, it is

not possible for us to fully confirm the estimates of the capacity values.

A representative of the staff of the Federal Power Commission has been consulted in connection with the power items. He concurs in general, with the views expressed in the preceeding paragraphs.

In Section XIII, page 16, of the amended application it is stated that a diversion of 1,500 cubic feet per second is adequate to maintain navigation in the Port of Chicago and the Illinois Waterway. The flow of 1,500 cubic feet per second is the authorized diversion exclusive of domestic pumpage. This rate of flow, without domestic pumpage, is adequate for operation of existing navigation facilities on the Illinois Waterway.

A survey report was transmitted to Congress on 3 September 1958 in which the authorization of duplicate navigation locks on the Illinois Waterway is recommended. This report will be published as House Document No. 31, 86th Congress, 1st Session. Studies of water requirements for operation of the recommended duplicate locks show that an average annual flow of 1,826 cubic feet per second would be required, representing an increase of 326 cubic feet per second over the amount of the presently authorized diversion.